

FILE 'CAPLUS' ENTERED AT 14:04:53 ON 25 JUN 2001

	E BENNER STEVEN/AU
L1	165 S E3-E5
L2	16444 S XANTHINE OR XANTHOSINE
L3	4 S L1 AND L2
	E MORONEY SIMON/AU
L4	19 S E3-E4
L5	1 S L4 AND L2
	E SWITZER C/AU
L6	6 S E8-E9

L6 ANSWER 4 OF 6 CAPLUS COPYRIGHT 2001 ACS  
 AN 1998:361398 CAPLUS  
 DN 129:136420  
 TI Redesigning nucleic acids  
 AU Benner, Steven A.; Battersby, Thomas R.; Eschgfaller, Bernd; Hutter, Daniel; Kodra, Janos T.; Lutz, Stefan; Arslan, Tuncer; Baschlin, Daniel K.; Blattler, Monika; Egli, Martin; Hammer, Christophe; Held, Heike A.; Horlacher, Jennifer; Huang, Zhen; Hyrup, Birgitte; Jenny, Thomas F.; Jurczyk, Simona C.; Konig, Marcel; von Krosigk, Ulrike; Lutz, Michael J.; MacPherson, Lawrence J.; Moroney, Simon E.; Muller, Eugen; Nambiar, Krishnan P.; Piccirilli, Joseph A.; **Switzer, Christopher Y.**; Vogel, Johannes J.; Richert, Clemens; Roughton, Andrew L.; Schmidt, Jurgen; Schneider, K. Christian; Stackhouse, Joseph  
 CS Department of Chemistry, Univ. of Florida, Gainesville, FL, 32611, USA  
 SO Pure Appl. Chem. (1998), 70(2), 263-266  
 CODEN: PACHAS; ISSN: 0033-4545  
 PB Blackwell Science Ltd.  
 DT Journal  
 LA English  
 AB A symposium with 24 refs.. A research program has applied the tools of synthetic org. chem. to systematically modify the structure of DNA and RNA oligonucleotides to learn more about the chem. principles underlying their ability to store and transmit genetic information. Oligonucleotides (as opposed to nucleosides) have long been overlooked by synthetic org. chemists as targets for structural modification. Synthetic chem. has now yielded oligonucleotides with 12 replicatable letters, modified backbones, and new insight into why Nature chose the oligonucleotide structures that she did.

L6 ANSWER 5 OF 6 CAPLUS COPYRIGHT 2001 ACS  
 AN 1993:619782 CAPLUS  
 DN 119:219782  
 TI Enzymic recognition of the base pair between isocytidine and isoguanosine  
 AU **Switzer, Christopher Y.**; Moroney, Simon E.; Benner, Steven A.  
 CS Lab. Org. Chem., ETH Zurich, Zurich, CH-8092, Switz.  
 SO Biochemistry (1993), 32(39), 10489-96  
 CODEN: BICHAW; ISSN: 0006-2960  
 DT Journal  
 LA English  
 AB The ability of various polymerases to catalyze the template-directed formation of a base pair between isoguanine (iso-G) and isocytosine (iso-C) in duplex oligonucleotides was investigated. A new procedure was developed for prepg. derivs. of deoxyisoguanosine suitable for incorporation into DNA using an automated DNA synthesizer. T7 RNA polymerase, AMV reverse transcriptase, and the Klenow fragment of DNA polymerase all incorporated iso-G opposite iso-C in a template. T4 DNA polymerase did not. Several polymerases also incorporated iso-G opposite T, presumably through pairing with a minor tautomeric form of iso-G complementary to T. In a template, iso-G directs the incorporation of both iso-C and T when Klenow fragment is the catalyst and only U when T7 RNA polymerase is the catalyst. Further, derivs. of iso-C undergo significant amts. of deamination under alk. conditions used for base deprotection after automated oligonucleotide synthesis. Both the deamination reaction of iso-C and the ambivalent tautomeric forms of iso-G make it unlikely that the (iso-C)-(iso-G) base pair was a part of

information storage roles. also contg. the A-T and G-C base pairs found in primitive forms of life that emerged on planet earth several billion years ago. Nevertheless, the extra letters in the genetic alphabet can serve useful roles in a contemporary lab. setting.

L4 ANSWER 13 OF 19 CAPLUS COPYRIGHT 2001 ACS  
AN 1989:569541 CAPLUS  
DN 111:169541  
TI Enzymatic incorporation of a new base pair into DNA and RNA  
AU Switzer, Christopher; **Moroney, Simon E.**; Benner, Steven A.  
CS Lab. Org. Chem., Swiss Fed. Inst. Technol., Zurich, 8092, Switz.  
SO J. Am. Chem. Soc. (1989), 111(21), 8322-3  
CODEN: JACSAT; ISSN: 0002-7863  
DT

L4 ANSWER 11 OF 19 CAPLUS COPYRIGHT 2001 ACS  
AN 1991:601275 CAPLUS  
DN 115:201275  
TI Abortive products as initiating nucleotides during transcription by T7  
RNA polymerase  
AU **Moroney, Simon E.**; Piccirilli, Joseph A.  
CS Lab. Org. Chem., Swiss Fed. Inst. Technol., Zurich, 8092, Switz.  
SO Biochemistry (1991), 30(42), 10343-9  
CODEN: BICHAW; ISSN: 0006-2960  
DT Journal  
LA

L4 ANSWER 10 OF 19 CAPLUS COPYRIGHT 2001 ACS  
AN 1991:650453 CAPLUS  
DN 115:250453  
TI A C-nucleotide base pair: methylpseudouridine-directed incorporation of  
formycin triphosphate into RNA catalyzed by T7 RNA polymerase  
AU Piccirilli, Joseph A.; **Moroney, Simon E.**; Benner, Steven A.  
CS Lab. Org. Chem., Swiss Fed. Inst. Technol., Zurich, 8092, Switz.  
SO Biochemistry (1991), 30(42), 10350-6  
CODEN: BICHAW; ISSN: 0006-2960  
DT Journal  
LA

L9 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2001 ACS  
 AN 1987:214290 CAPLUS  
 DN 106:214290  
 TI Synthesis and properties of **oligonucleotides** containing  
 2'-deoxynebularine and 2'-deoxyxanthosine  
 AU Eritja, Ramon; Horowitz, Daniel M.; Walker, Peter A.; Ziehler-Martin, J.  
 Paige; Boosalis, Michael S.; Goodman, Myron F.; Itakura, Keiichi; Kaplan,  
 Bruce E.  
 CS Dep. Mol. Gen., Beckman Res. Inst. City of Hope, Duarte, CA, 91010, USA  
 SO Nucleic Acids Res. (1986), 14(20), 8135-53  
 CODEN: NARHAD; ISSN: 0305-1048  
 DT Journal  
 LA English  
 AB **Oligonucleotides** contg. 2'-deoxynebularine (dN; I) and  
 2'-deoxyxanthosine (dX; II), were prepd. by using std. solid-phase  
 procedures. The thermal stabilities of duplexes contg. dX, dN, and  
 2'-deoxyinosine (dI) base-paired with the 4 natural bases were measured.  
**Xanthine** base pairs have stabilities at pH 5.5 that are similar to  
 those of dI-contg. duplexes at neutral pH. When **xanthine** is  
 paired with adenine or cytosine an unusual stabilization of the duplex  
 structure is obsd. at acid pH. Incorporation of the mismatched base  
 pairs  
 opposite **template xanthine** sites were measured using  
 Drosophila DNA polymerase .alpha.. The relative nucleoside incorporation  
 rates are in the order: T > C .mchgt. A .apprxeq. G. These rates do not  
 correlate with relative thermodyn. stabilities of the mismatched base  
 pairs  
 with **xanthine** obtained from Tm measurements: T > G > A  
 .apprxeq.. It is suggested that DNA polymerase insertion rates are  
 greatest when the mismatched base pairs can be formed in accordance with  
 Waston-Crick as opposed to other base pairing geometries even though  
 other  
 geometries, e.g. wobble, may result in a more stable final DNA product.

L19 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2001 ACS

AN 1993:619782 CAPLUS

DN 119:219782

TI Enzymic recognition of the base pair between **isocytidine** and **isoguanosine**

AU Switzer, Christopher Y.; Moroney, Simon E.; Benner, Steven A.

CS Lab. Org. Chem., ETH Zurich, Zurich, CH-8092, Switz.

SO Biochemistry (1993), 32(39), 10489-96

CODEN: BICHAW; ISSN: 0006-2960

DT Journal

LA English

AB The ability of various polymerases to catalyze the **template**-directed formation of a base pair between **isoguanine** (iso-G) and **isocytosine** (iso-C) in duplex **oligonucleotides** was investigated. A new procedure was developed for prepg. derivs. of deoxyisoguanosine suitable for incorporation into DNA using an automated DNA synthesizer. T7 RNA polymerase, AMV reverse transcriptase, and the Klenow fragment of DNA polymerase all incorporated iso-G opposite iso-C

in

a **template**. T4 DNA polymerase did not. Several polymerases also incorporated iso-G opposite T, presumably through pairing with a minor tautomeric form of iso-G complementary to T. In a **template**, iso-G directs the incorporation of both iso-C and T when Klenow

fragment

is the catalyst and only U when T7 RNA polymerase is the catalyst. Further, derivs. of iso-C undergo significant amts. of deamination under alk. conditions used for base deprotection after automated **oligonucleotide** synthesis. Both the deamination reaction of iso-C and the ambivalent tautomeric forms of iso-G make it unlikely that the (iso-C)-(iso-G) base pair was a part of information storage mols. also contg. the A-T and G-C base pairs found in primitive forms of life that emerged on planet earth several billion years ago. Nevertheless, the extra letters in the genetic alphabet can serve useful roles in a contemp



L19 ANSWER 3 OF 5 CAPLUS COPYRIGHT 2001 ACS  
AN 1999:531944 CAPLUS  
DN 131:243513  
TI Synthesis of 2'-deoxyisoguanosine 5'-triphosphate and 2'-deoxy-5-methylisocytidine 5'-triphosphate  
AU Jurczyk, Simona C.; Kodra, Janos T.; Park, Jeong-Ho; Benner, Steven A.; Battersby, Thomas R.  
CS EraGen, Inc., Alachua, FL, 32615, USA  
SO Helv. Chim. Acta (1999), 82(7), 1005-1015  
CODEN: HCACAV; ISSN: 0018-019X  
PB Verlag Helvetica Chimica Acta  
DT Journal  
LA English  
OS CASREACT 131:243513  
AB The syntheses of the 5'-triphosphates of 2'-deoxyisoguanosine (p3isoGd) and 2'-deoxy-5-methylisocytidine (p3me5isoCd), new bases for the genetic alphabet, are described. The triphosphates were synthesized from the corresponding nucleosides using a transient-protection procedure. The introduction of a Me group at the 5-position of 2'-deoxyisocytidine remarkably improved the stability of the triphosphate. Characterization of the triphosphates included enzymic incorporation opposite the complem

L17 ANSWER 12 OF 19 CAPLUS COPYRIGHT 2001 ACS

AN 1993:621015 CAPLUS

DN 119:221015

TI Site-specific enzymic incorporation of an unnatural base,  
N6-(6-aminoethyl)**isoguanosine**, into RNA

AU Tor, Yitzhak; Dervan, Peter B.

CS Beckman Inst., California Inst. Technol., Pasadena, CA, 91125, USA

SO J. Am. Chem. Soc. (1993), 115(11), 4461-7

CODEN: JACSAT; ISSN: 0002-7863

DT Journal

LA English

AB An efficient enzymic method is described for the sequence-specific incorporation of a functionalizable modified base into RNA mols. A deoxy-5-methylisocytidine (dMeisoC) in the DNA **template** directs the T7 RNA polymerase incorporation of N6-(6-aminoethyl) **isoguanosine** (6-AH-isoG) into the transcribed RNA product. The misincorporation of isoGTP derivs. opposite T is eliminated in the presence of ATP, and the misincorporation of A opposite dMeisoC is negligible in the presence of isoGTP derivs. The isolated yield of RNA products using modified **templates** is approx. 50% that for reactions using natural **templates**. A posttranscriptional modification of the reactive primary amino group with N-hydroxysuccinimide-activated biotin or the dianhydride of EDTA affords site-specifically modified RNA sequences suitable for further studies. This method for the generation of RNA mols. contg. a primary amine suitable for posttranscription modification should be useful for mapping the structure of folded RNA polymers and RNA-protein complexes by affinity cleavage and affinity labeling.

L3 ANSWER 1 OF 4 CAPLUS COPYRIGHT 2001 ACS  
 AN 1998:348141 CAPLUS  
 DN 129:92131  
 TI Recognition of a non-standard base pair by thermostable DNA polymerases  
 AU Lutz, Michael J.; Horlacher, Jennifer; **Benner, Steven A.**  
 CS Department of Chemistry, ETH Zurich, Zurich, CH-8092, Switz.  
 SO Bioorg. Med. Chem. Lett. (1998), 8(10), 1149-1152  
 CODEN: BMCLE8; ISSN: 0960-894X  
 PB Elsevier Science Ltd.  
 DT Journal  
 LA English  
 AB Examn. of several com. available thermostable DNA polymerases identifies 9.degree.N DNA polymerase as single enzyme that could incorporate two components of an expanded genetic alphabet, 2,4-diaminopyrimidine and **xanthosine** as deoxynucleoside triphosphate opposite their cognate base in a DNA template.

L3 ANSWER 2 OF 4 CAPLUS COPYRIGHT 2001 ACS  
 AN 1996:242397 CAPLUS  
 DN 124:310957  
 TI Differential discrimination of DNA polymerases for variants of the non-standard nucleobase pair between **xanthosine** and 2,4-diaminopyrimidine, two components of an expanded genetic alphabet  
 AU Lutz, Michael J.; Held, Heike A.; Hottiger, Michael; Hubscher, Ulrich; **Benner, Steven A.**  
 CS Department Chemistry, Swiss Federal Institute Technology, Zurich, Switz.  
 SO Nucleic Acids Res. (1996), 24(7), 1308-13  
 CODEN: NARHAD; ISSN: 0305-1048  
 DT Journal  
 LA English  
 AB Mammalian DNA polymerases .alpha. and .epsilon., the Klenow fragment of Escherichia coli DNA polymerase I and HIV-1 reverse transcriptase (RT) were examd. for their ability to incorporate components of an expanded genetic alphabet in different forms. Expts. were performed with templates  
 contg. 2'-deoxyxanthosine (dX) or 2'-deoxy-7-deazaxanthosine (c7dX), both able to adopt a hydrogen bonding acceptor-donor-acceptor pattern on a purine nucleus (puADA). Thus these heterocycles are able to form a non-std. nucleobase pair with 2,4-diaminopyrimidine (pyDAD) that fits the Watson-Crick geometry, but is joined by a non-std. hydrogen bonding pattern. HIV-1 RT incorporated d(pyDAD)TP opposite dX with a high efficiency that was largely independent of pH. Specific incorporation opposite c7dX was significantly lower and also independent of pH. Mammalian DNA polymerases .alpha. and .epsilon. from calf thymus and the Klenow fragment from E.coli DNA polymerase I failed to incorporate d(pyDAD)TP opposite c7cX.

L3 ANSWER 3 OF 4 CAPLUS COPYRIGHT 2001 ACS  
 AN 1995:759015 CAPLUS  
 DN 123:190502  
 TI Enzymic incorporation of novel heterocyclic bases giving rise to non-standard base-pairing into DNA or RNA oligonucleotides  
 IN **Benner, Steven A.**  
 PA Switz.  
 SO U.S., 13 pp.  
 CODEN: USXXAM  
 DT Patent  
 LA English

	PATENT NO.	ND	DATE	APPLICATION	DATE
PI	US 5432272	A	19950711	US 1990-594290	19901009
	US 6001983	A	19991214	US 1995-375132	19950117
	US 5965364	A	19991012	US 1996-775402	19961231
	US 6140496	A	20001031	US 1996-775401	19961231
PRAI	US 1990-594290	A2	19901009		
	US 1995-375132	A2	19950117		
	US 1995-542142	A2	19951012		

OS MARPAT 123:190502

AB Enzymic methods for incorporating novel pairs of base-pairing heterocyclic

bases into oligonucleotides is described. The bases used are structurally

involved similar to purine and pyrimidine bases with the functional groups

in hydrogen-bonding in Watson-Crick base-pairing retained but with other atoms within the mol. substituted. These bases do not disrupt the structure of the double-stranded nucleic acid. A DNA sequence incorporating the unusual pyrimidine 3.beta.-D-ribofuranosyl-(2,6-diaminopyrimidine) (K) downstream of a T7 promoter was synthesized chem. and transcribed with T7 polymerase in the presence of **xanthosine** triphosphate (XTP). Full-length transcripts were obsd. when transcribed in the presence of XTP. Some misincorporation of adenine opposite K was obsd. with low concns. of XTP in relation to ATP. Such misincorporation was due to the enzyme rather than to the presence of minor tautomers of the base analogs.

L3 ANSWER 4 OF 4 CAPLUS COPYRIGHT 2001 ACS

AN 1990:212597 CAPLUS

DN 112:212597

TI Enzymic incorporation of a new base pair into DNA and RNA extends the genetic alphabet

AU Piccirilli, Joseph A.; Krauch, Tilman; Moroney, Simon E.; **Benner, Steven A.**

CS Lab. Org. Chem., ETH Zurich, Zurich, CH-8092, Switz.

SO Nature (London) (1990), 343(6253), 33-7

CODEN: NATUAS; ISSN: 0028-0836

DT Journal

LA English

AB A new Watson-Crick base pair [.kappa.-**xanthine** or 7-Me oxyformycin B, where .kappa. = 3-.beta.-D-ribofuranosyl-(2,6-diaminopyrimidine) with a H bonding pattern different from that in the A.cntdot.T and G.cntdot.C base pairs, is incorporated into duplex DNA and RNA by DNA and RNA polymerases and expands the genetic alphabet from 4 to 6 letters. This expansion could lead to RNAs with greater diversity in functional groups and greater catalytic potential.

**WEST**

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L5: Entry 1 of 28

File: USPT

May 29, 2001

DOCUMENT-IDENTIFIER: US 6238917 B1

TITLE: Asymmetric hammerhead ribozymes

## DEPR:

Modified bases may be synthesized as follows: purine; synthesis and incorporation into ribozyme (Slim, 1992; Fu, 1992; Fu, 1993); 7-deazaguanosine, synthesis and incorporation into ribozyme (Fu, 1993); inosine, synthesis and incorporation into ribozyme (Slim, 1992; Fu, 1993); 7-deazaadenosine, synthesis and incorporation into ribozyme (Fu, 1992; Seela, 1993). O6-methylguanosine, synthesis and incorporation into ribozyme (Grasby, 1993); 2,6-diaminopurine, synthesis (Sproat, 1991); 2-aminopurine, synthesis and incorporation into ribozyme (Ng, 1994; Tuschl, 1993); isoguanosine, synthesis and incorporation into ribozyme (Ng, 1994; Tuschl, 1993); xanthosine, synthesis and incorporation into ribozyme (Tuschl, 1993); 6-azathymidine, 6-aza-2'-deoxycytidine, synthesis and incorporation into oligonucleotides (Sanghvi, 1993); 5-alkenylpyrimidines; 5-propyne (Fenster et al. 1994); inosine (Chemgenes); 5-methylcytosine; pseudouridine; abasic ribose or deoxyribose (Beigelman et al. 1995A).

☐ 3. Document ID: US 6037120 A

L3: Entry 3 of 6

File: USPT

Mar 14, 2000

US-PAT-NO: 6037120

DOCUMENT-IDENTIFIER: US 6037120 A

TITLE: Recognition of oligonucleotides containing non-standard base pairs

DATE-ISSUED: March 14, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven Albert	Gainesville	FL	32605	N/A

US-CL-CURRENT: 435/6; 536/23.5

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 4. Document ID: US 6001983 A

L3: Entry 4 of 6

File: USPT

Dec 14, 1999

US-PAT-NO: 6001983

DOCUMENT-IDENTIFIER: US 6001983 A

TITLE: Oligonucleotides with non-standard bases and methods for preparing same

DATE-ISSUED: December 14, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven Albert	Gainesville	FL	32605-4147	N/A

US-CL-CURRENT: 536/23.1; 435/91.1, 435/91.41, 536/25.3, 536/25.31, 536/25.32, 536/25.33, 536/25.34, 536/25.4

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 5. Document ID: US 5994076 A

L3: Entry 5 of 6

File: USPT

Nov 30, 1999

US-PAT-NO: 5994076

DOCUMENT-IDENTIFIER: US 5994076 A

TITLE: Methods of assaying differential expression

DATE-ISSUED: November 30, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chenchik; Alex	Palo Alto	CA	N/A	N/A
Jokhadze; George	Mountain View	CA	N/A	N/A
Bibilashvilli; Robert	Moscow	N/A	N/A	RUX

US-CL-CURRENT: 435/6; 435/91.1, 435/91.2, 536/23.1, 536/24.3, 536/24.31, 536/24.33

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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☐ 6. Document ID: US 5432272 A

L3: Entry 6 of 6

File: USPT

Jul 11, 1995

US-PAT-NO: 5432272

DOCUMENT-IDENTIFIER: US 5432272 A

TITLE: Method for incorporating into a DNA or RNA oligonucleotide using nucleotides bearing heterocyclic bases

DATE-ISSUED: July 11, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven A.	CH-8006 Zurich	N/A	N/A	CHX

US-CL-CURRENT: 536/25.3; 435/91.1, 435/91.41, 435/91.51, 536/25.33

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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Terms	Documents
12 same primer\$1	6

Display

10

Documents, starting with Document:

6

**Display Format:**

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Change Format

**WEST**[Generate Collection](#)**Search Results - Record(s) 1 through 6 of 6 returned.**☐ 1. Document ID: US 6221617 B1

L3: Entry 1 of 6

File: USPT

Apr 24, 2001

US-PAT-NO: 6221617

DOCUMENT-IDENTIFIER: US 6221617 B1

TITLE: Bioassay for growth hormone releasing hormone

DATE-ISSUED: April 24, 2001

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Heinrich; Julie	Lincoln	NE	68502	N/A
Grotjan; H. Edward	Lake St. Louis	MO	63367	N/A
Wagner; Fred W.	Walton	NE	68451	N/A
Xia; Yuannan	Lincoln	NE	68504	N/A

US-CL-CURRENT: 435/7.2; 435/21, 435/325, 435/7.21, 435/7.6, 435/8

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 2. Document ID: US 6075184 A

L3: Entry 2 of 6

File: USPT

Jun 13, 2000

US-PAT-NO: 6075184

DOCUMENT-IDENTIFIER: US 6075184 A

TITLE: Purified proteins, recombinant DNA sequences and processes for producing caffeine free beverages

DATE-ISSUED: June 13, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Stiles; John I.	Kaneahe	HI	N/A	N/A
Moisyadi; Istefo	Honolulu	HI	N/A	N/A
Neupane; Kabi Raj	Honolulu	HI	N/A	N/A

US-CL-CURRENT: 800/298; 435/320.1, 435/419, 435/468, 536/23.6, 536/24.1, 800/278, 800/295

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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**WEST**[Generate Collection](#)**Search Results - Record(s) 11 through 19 of 19 returned.**☐ 11. Document ID: US 5679512 A

L6: Entry 11 of 19

File: USPT

Oct 21, 1997

US-PAT-NO: 5679512

DOCUMENT-IDENTIFIER: US 5679512 A

TITLE: Method for introducing defined sequences at the 3'end of polynucleotides

DATE-ISSUED: October 21, 1997

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Laney; Maureen	Palo Alto	CA	N/A	N/A
Chen; Yan	Palo Alto	CA	N/A	N/A
Ullman; Edwin F.	Atherton	CA	N/A	N/A
Hahnenberger; Karen M.	Cupertino	CA	N/A	N/A

US-CL-CURRENT: 435/6; 435/91.1

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 12. Document ID: US 5658727 A

L6: Entry 12 of 19

File: USPT

Aug 19, 1997

US-PAT-NO: 5658727

DOCUMENT-IDENTIFIER: US 5658727 A

TITLE: Heterodimeric receptor libraries using phagemids

DATE-ISSUED: August 19, 1997

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Barbas; Carlos	La Jolla	CA	N/A	N/A
Kang; Angray	Carlsbad	CA	N/A	N/A
Lerner; Richard A.	La Jolla	CA	N/A	N/A

US-CL-CURRENT: 435/6; 435/235.1, 435/320.1, 435/91.2, 530/387.3

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 13. Document ID: US 5654142 A

L6: Entry 13 of 19

File: USPT

Aug 5, 1997

US-PAT-NO: 5654142  
DOCUMENT-IDENTIFIER: US 5654142 A

TITLE: Method for nucleic acid amplification using inosine triphosphates to partially replace guanosine triphosphates in the synthesis of multiple RNA copies

DATE-ISSUED: August 5, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kievits; Tim	Vught	N/A	N/A	NLX
Lens; Peter Franklin	Den Bosch	N/A	N/A	NLX
Adriaanse; Henriette Maria Aleida	Boxmeer	N/A	N/A	NLX

US-CL-CURRENT: 435/6; 435/91.2, 435/91.21

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 14. Document ID: US 5627032 A

L6: Entry 14 of 19

File: USPT

May 6, 1997

US-PAT-NO: 5627032

DOCUMENT-IDENTIFIER: US 5627032 A

TITLE: Composite primers for nucleic acids

DATE-ISSUED: May 6, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Ulanovsky; Levy	Ann Arbor	MI	48105-2828	N/A

US-CL-CURRENT: 435/6; 536/23.1, 536/24.3

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 15. Document ID: US 5616500 A

L6: Entry 15 of 19

File: USPT

Apr 1, 1997

US-PAT-NO: 5616500  
DOCUMENT-IDENTIFIER: US 5616500 A

TITLE: Trichohyalin and transglutaminase-3 and methods of using same

DATE-ISSUED: April 1, 1997

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Steinert; Peter M.	Rockville	MD	N/A	N/A
Kim; In-Gyu	Rockville	MD	N/A	N/A
Chung; Soo-Il	Rockville	MD	N/A	N/A
Park; Sang-chul	Seoul	N/A	N/A	KRX

US-CL-CURRENT: 435/320.1; 435/193, 435/325, 435/348, 435/69.1, 536/22.1, 536/23.1,  
536/23.2, 536/23.5, 536/24.3, 536/24.31, 536/24.33

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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☐ 16. Document ID: US 5578467 A

L6: Entry 16 of 19

File: USPT

Nov 26, 1996

US-PAT-NO: 5578467

DOCUMENT-IDENTIFIER: US 5578467 A

TITLE: Use of deoxyinosine containing primers to balance primer efficiency in the amplification of nucleic acid molecules

DATE-ISSUED: November 26, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Schuster; David M.	Poolesville	MD	N/A	N/A
Rashtchian; Ayoub	Gaithersburg	MD	N/A	N/A

US-CL-CURRENT: 435/91.2; 435/6, 435/91.52

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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☐ 17. Document ID: US 5408038 A

L6: Entry 17 of 19

File: USPT

Apr 18, 1995

US-PAT-NO: 5408038  
DOCUMENT-IDENTIFIER: US 5408038 A

TITLE: Nonnatural apolipoprotein B-100 peptides and apolipoprotein B-100-apolipoprotein A-I fusion peptides

DATE-ISSUED: April 18, 1995

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Smith; Richard S.	Del Mar	CA	N/A	N/A
Curtiss; Linda K.	San Diego	CA	N/A	N/A
Koduri; Kanaka R.	San Diego	CA	N/A	N/A
Witztum; Joseph L.	San Diego	CA	N/A	N/A
Young; Stephen G.	Hillsborough	CA	N/A	N/A

US-CL-CURRENT: 530/359; 435/7.1, 536/23.5

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw	Desc	Image
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☐ 18. Document ID: US 5142033 A

L6: Entry 18 of 19

File: USPT

Aug 25, 1992

US-PAT-NO: 5142033

DOCUMENT-IDENTIFIER: US 5142033 A

TITLE: Structure-independent DNA amplification by the polymerase chain reaction

DATE-ISSUED: August 25, 1992

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Innis; Michael A.	Moraga	CA	N/A	N/A

US-CL-CURRENT: 536/23.1; 435/15, 435/183, 435/6, 435/810, 435/91.2, 436/501, 436/808, 530/350, 530/820, 536/26.26, 536/27.2

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw	Desc	Image
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☐ 19. Document ID: US 5091310 A

L6: Entry 19 of 19

File: USPT

Feb 25, 1992

US-PAT-NO: 5091310

DOCUMENT-IDENTIFIER: US 5091310 A

TITLE: Structure-independent DNA amplification by the polymerase chain reaction

DATE-ISSUED: February 25, 1992

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Innis; Michael A.	Moraga	CA	N/A	N/A

US-CL-CURRENT: 435/91.2; 435/6, 435/810, 436/501, 436/808, 536/23.1, 536/26.26

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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**WEST**[Generate Collection](#)**Search Results - Record(s) 1 through 6 of 6 returned.**☐ 1. Document ID: US 6140496 A

L7: Entry 1 of 6

File: USPT

Oct 31, 2000

US-PAT-NO: 6140496

DOCUMENT-IDENTIFIER: US 6140496 A

TITLE: Precursors for deoxyribonucleotides containing non-standard nucleosides

DATE-ISSUED: October 31, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven Albert	Gainesville	FL	32605	N/A

US-CL-CURRENT: 536/27.1; 435/6

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 2. Document ID: US 6037120 A

L7: Entry 2 of 6

File: USPT

Mar 14, 2000

US-PAT-NO: 6037120

DOCUMENT-IDENTIFIER: US 6037120 A

TITLE: Recognition of oligonucleotides containing non-standard base pairs

DATE-ISSUED: March 14, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven Albert	Gainesville	FL	32605	N/A

US-CL-CURRENT: 435/6; 536/23.5

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 3. Document ID: US 6001983 A

L7: Entry 3 of 6

File: USPT

Dec 14, 1999

US-PAT-NO: 6001983

DOCUMENT-IDENTIFIER: US 6001983 A

TITLE: Oligonucleotides with non-standard bases and methods for preparing same

DATE-ISSUED: December 14, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven Albert	Gainesville	FL	32605-4147	N/A

US-CL-CURRENT: 536/23.1; 435/91.1, 435/91.41, 536/25.3, 536/25.31, 536/25.32,  
536/25.33, 536/25.34, 536/25.4

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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☐ 4. Document ID: US 5965364 A

L7: Entry 4 of 6

File: USPT

Oct 12, 1999

US-PAT-NO: 5965364

DOCUMENT-IDENTIFIER: US 5965364 A

TITLE: Method for selecting functional deoxyribonucleotide derivatives

DATE-ISSUED: October 12, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven Albert	Gainesville	FL	32605	N/A

US-CL-CURRENT: 435/6; 435/91.2, 436/94

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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☐ 5. Document ID: US 5958702 A

L7: Entry 5 of 6

File: USPT

Sep 28, 1999

US-PAT-NO: 5958702

DOCUMENT-IDENTIFIER: US 5958702 A

TITLE: Receptor-assisted combinatorial chemistry

DATE-ISSUED: September 28, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven Albert	Pasadena	CA	91106	N/A

US-CL-CURRENT: 435/7.1; 530/339

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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☐ 6. Document ID: US 5958784 A

L7: Entry 6 of 6

File: USPT

Sep 28, 1999

US-PAT-NO: 5958784

DOCUMENT-IDENTIFIER: US 5958784 A

TITLE: Predicting folded structures of proteins

DATE-ISSUED: September 28, 1999

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven Albert	CH-8006 Zurich	N/A	N/A	CHX

US-CL-CURRENT: 436/86; 436/89

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KMC	Draw Desc	Image
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**WEST**[Generate Collection](#)**Search Results - Record(s) 1 through 4 of 4 returned.**☐ 1. Document ID: US 6063571 A

L8: Entry 1 of 4

File: USPT

May 16, 2000

US-PAT-NO: 6063571

DOCUMENT-IDENTIFIER: US 6063571 A

TITLE: Process for amplifying nucleic acids using DNA/PNA primers

DATE-ISSUED: May 16, 2000

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Uhlmann; Eugen	Glashutten	N/A	N/A	DEX
Breipohl; Gerhard	Frankhurt	N/A	N/A	DEX
Benner; Steven A.	Zurich	N/A	N/A	CHX
Lutz; Michael	Offenburg	N/A	N/A	DEX

US-CL-CURRENT: 435/6; 435/91.1, 435/91.2

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 2. Document ID: US 5432272 A

L8: Entry 2 of 4

File: USPT

Jul 11, 1995

US-PAT-NO: 5432272

DOCUMENT-IDENTIFIER: US 5432272 A

TITLE: Method for incorporating into a DNA or RNA oligonucleotide using nucleotides bearing heterocyclic bases

DATE-ISSUED: July 11, 1995

## INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Benner; Steven A.	CH-8006 Zurich	N/A	N/A	CHX

US-CL-CURRENT: 536/25.3; 435/91.1, 435/91.41, 435/91.51, 536/25.33

Full	Title	Citation	Front	Review	Classification	Date	Reference	Claims	KWC	Draw Desc	Image
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☐ 3. Document ID: US 5216141 A

L8: Entry 3 of 4

File: USPT

Jun 1, 1993

(FILE 'HOME' ENTERED AT 14:04:28 ON 25 JUN 2001)

FILE 'CAPLUS' ENTERED AT 14:04:53 ON 25 JUN 2001

E BENNER STEVEN/AU  
L1 165 S E3-E5  
L2 16444 S XANTHINE OR XANTHOSINE  
L3 4 S L1 AND L2  
E MORONEY SIMON/AU  
L4 19 S E3-E4  
L5 1 S L4 AND L2  
E SWITZER C/AU  
L6 6 S E8-E9  
L7 350 S L2 AND (PROBE? OR PRIMER? OR OLIGONUCLEOTIDE?)  
L8 19 S L2 AND TEMPLATE?  
L9 7 S L8 AND (PRIMER? OR PROBE? OR OLIGONUCLEOTIDE?)  
L10 300 S ISOCYTOSINE  
L11 107 S ISOGUANOSINE  
L12 64 S ISOCYTIDINE  
L13 146 S ISOGUANINE  
L14 308130 S PROBE? OR OLIGONUCLEOTIDE? OR PRIMER?  
L15 42 S L14 AND (L10 OR L11 OR L12 OR L13)  
L16 7873 S L14 AND TEMPLATE?  
L17 19 S TEMPLATE? AND (L11 OR L10 OR L12 OR L13)  
L18 7873 S L14 AND TEMPLATE?  
L19 5 S L15 AND TEMPLATE?

STN

12/11/02

- L1 0 (T4 (3A) (POLYMERASE OR POLYMERASES)) AND (NON STANDARD BASE OR NON STANDARD NUCLEOTIDE OR NON STANDARD NUCLEOSIDE OR NON STANDARD BASES OR NON STANDARD NUCLEOTIDES OR NON STANDARD NUCLEOSIDE)
- L2 2 (T4 (3A) (POLYMERASE OR POLYMERASES)) AND (ISO G OR ISO C OR "ISO-C" OR "ISO-G" OR XANTHOSINE OR DEOXYXANTHOSINE OR ISOGUANINE OR ISOCYTOSINE OR AMINO ADENINE OR INOSINE OR DEOXYINOSINE)
- L4 2 (T4 (3A) (POLYMERASE OR POLYMERASES)) AND (DEOXYISOCYTOSINE OR DEOXYISOGUANOSINE OR DEOXYISOGUANINE)
- L6 0 (T4 (3A) (POLYMERASE OR POLYMERASES)) AND (DIAMINOPYRIMIDINE)